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April 20, 2012

Joseph DiMura, P.E.
Director
Bureau of Water Compliance
Division of Water
New York State Department of Environmental Conservation
625 Broadway, Albany, New York
12233-3506

Re: Order on Consent (CSO Order)
DEC Case#CO2-20000107-8
Long-Term Control Plan Baseline Assumptions

Dear Mr. DiMura,

This letter is being submitted in response to your February 1, 2012 letter regarding the Long-Term Control Plan Baseline Assumptions presented to the New York State Department of Environmental Conservation by the New York City Department of Environmental Protection (DEP) on January 19, 2012. DEP's responses to the questions are provided below and DEP will be reaching out to the DEC to begin scheduling technical meeting(s) to further discuss and finalize these baseline assumptions along with discussing our Green Infrastructure (GI) specific assumptions.

1. ***Rainfall Conditions.*** *The City has proposed using calendar year 2008 as the new baseline year for rainfall conditions based on an analysis of historical rainfall data from the rain gauge at JFK International Airport (JFK). There are several rain gauges within New York City that provide official historical rainfall data for the metropolitan area, including gauges at La Guardia Airport (LGA), JFK, and Central Park. Although rainfall data from gauge at JFK was used for the baseline conditions for the waterbody/watershed facility plans, the Department requests that the City analyze historical data from LGA rain gauge, which appears to be located in the geographic center of the City, to identify a new baseline year. In addition, the Department requests that the City provide the following rainfall statistics for each year covered in the analysis as well as the historical average:*

    a. *Annual total rainfall (inches)*
    b. *July rainfall (inches)*
    c. *November rainfall (inches)*
    d. *Number of days with rainfall > 2 inches*
    e. *Number of days with rainfall > 1 inch*

f. Average peak storm intensity (in/hr) (define 'peak' storm)
g. Average storm volume (inches)
h. Average storm intensity (in/hr)
i. Annual total duration of storms (hours)
j. Average storm duration (hours)
k. Annual average number of storms
l. Annual average time between storms (hours)

In the event that the outcome of this new analysis is similar to the analysis of rainfall data from JFK, the Department would like to discuss the possibility of constructing a baseline year that is comprised of a single year that most closely matches the historical average but that also includes a response analysis of one or more intense rainfall events from another year to ensure that some intense rainfall events are included in the baseline year.

Response:

DEP's statistical analysis included observations at all of the four major rain gages (JFK, CPK, LGA, and EWR) for 1969-2010 to determine the rainfall statistics against which each annual time series was compared. Therefore, there were four independent time series considered (one from each gage), and the annual rainfall record with the smallest deviation from the population statistics was selected as most representative. The specific statistics used to select the typical annual rainfall record were based on statistics used previously for the development of WWFPs and included:

- Annual total rainfall (inches)
- July total rainfall volume (inches)
- November total volume (inches)
- Number of days >2"
- Average peak storm intensity (inches/hour)

JFK 2008 was determined to be the most representative annual rainfall record for the 1969-2010 time series based on the above statistics. DEP presented to DEC the above rainfall parameters for JFK 2008 compared to the previous typical annual rainfall record used (JFK 1988) and the updated time series for all four gages used to identify the best statistical fit across all gages and all years.

Table 1 below provides the additional statistics DEC requested for both JFK 2008 as compared to the average observed values at all four gages between 1969 and 2010. Although LGA is more centrally located, statistically the 2008 JFK rainfall data is more appropriate to represent typical rainfall conditions based on parameters analyzed.

Table 1 - Statistical Comparison of JFK 2008 versus All Data from 1969-2010

Summary Table All Parameters	Avg. All Stations '69-'10	JFK 2008
a. Annual total rainfall (in)	45.4	46.3
b. July rainfall (in)	4.3	3.3
c. Summer Rainfall Amount (in)	12.2	10.1
d. November rainfall (in)	3.7	3.3
e. Autumn Rainfall Amount (in)	11.3	13.6
f. Number of days with rainfall > 2 inch	2	3
g. Number of days with rainfall > 1 inch	12	13
h. Average peak storm intensity (in/hr.)	0.15	0.15
i. Average storm volume (in)	0.42	0.39
j. Average storm intensity (in/hr.)	0.06	0.06
k. Annual total duration of storm (hours)	779	686
l. Average storm duration (hours)	7	7
m. Annual average number of storms	108	120
n. Annual average time between storms (hours)	75	67

In addition to the above analysis, DEP also looked specifically at the last 15 years of data (CY1996-2010) to select a typical average rainfall year and selected storms that are within +/- 10% of the total annual average rainfall volumes. This analysis incorporated the parameters listed above and also included average rainfall volumes for the summer and autumn seasons. The JFK 2008 rainfall statistics fell within an acceptable range for many of the key parameters including total annual rainfall volume that was closer to the 60th percentile. In addition, there was a peak intensity that exceeded typical values and would be representative of a more intense rainfall event that DEC wanted to include in the analysis. Furthermore, to include more intense rainfall events into the analyses of the LTCP alternative, DEP will be using 10 - 15 years of recent rainfall data to evaluate pathogens attainments of the recommended alternative.

Table 2 – Statistical Analysis of Rainfall Data from 1996 – 2010

Station	Year	Average Storm Depth mm/event	Average Average Storm Intensity mm/hr	Average Peak Storm Intensity mm/hr	Average Duration hr	Total Duration hr	Number of storms	Summer (JJA) Rainfall Depth mm	Autumn (SON) Rainfall Depth mm	July Rainfall Depth mm	November Rainfall Depth mm	Annual Rainfall mm	Number of Wet Days	Number of Days > 1"	Number of Days > 2"
Mean		9.88	1.46	3.56	6.72	787	114	325	285	108	74.4	1,143	122	10.9	2.17
Min		8.53	1.17	2.81	6.30	666	97	176	186	26	33.3	1,121	107	6	0
Max		10.93	1.68	4.24	7.23	967	133	445	474	269	115.3	1,175	131	14	4
Stdev		0.86	0.15	0.47	0.29	89	12	88	87	70	27.9	18	8	2	1
Percentile	40%	9.87	1.39	3.44	6.77	756	106	269	251	71	69.6	1,121	116	11	2
Percentile	60%	10.60	1.47	3.66	6.94	804	116	354	333	138	90.3	1,179	123	13	3
JFK	2008	9.79	1.45	3.88	6.68	686	120	256	346	84	84.9	1,175	128	13	3
La Guardia	1996	9.68	1.58	3.33	6.30	921	121	263	335	98	73.2	1,172	126	12	2
La Guardia	2005	10.58	1.32	2.81	6.57	770	109	203	474	59	90.7	1,153	116	10	4
La Guardia	1997	10.18	1.63	3.65	6.92	688	113	412	199	269	106.5	1,151	123	9	2
JFK	2007	10.85	1.57	4.02	6.47	759	106	382	221	97	58.7	1,150	119	14	2
Central Park	2000	9.35	1.40	3.38	6.60	790	97	398	249	178	83.8	1,140	124	10	2
La Guardia	2009	8.91	1.38	3.59	6.70	967	128	445	205	161	33.3	1,140	128	9	0
JFK	2003	8.53	1.17	2.88	6.88	666	133	353	254	59	99.3	1,135	131	12	1
JFK	2009	8.69	1.34	3.34	6.66	802	130	373	265	90	35.6	1,130	131	12	1
La Guardia	1998	10.93	1.68	4.20	6.40	815	103	272	186	29	37.6	1,126	107	13	4
JFK	2006	10.70	1.60	4.24	7.23	798	105	372	305	141	115.3	1,124	116	11	1
Newark	1999	10.38	1.41	3.38	7.19	777	108	176	385	26	73.4	1,121	113	6	4

Within Range
Greater Than
Less than

2. ***Water Quality Projections.*** *The City has proposed evaluating the attainment of the DO water quality standards using the proposed 2008 baseline year and evaluating the attainment of the pathogen water quality standards on a seasonal basis using a 10 to 15 year period, from 1996 to 2010, which brackets the proposed baseline year. The Department concurs with this general approach to evaluating attainment with water quality standards, but further discussion is required to define what constitutes a 'seasonal period' and "seasonal average", and whether rainfall data from calendar year 2011 should be included in the pathogen analyses.*

   Response:

   DEP is proposing that the seasonal period be the recreational bathing season as defined by the period during which the bathing beaches are open. This would be a period of approximately 90-days from Memorial Day to Labor Day. Beach protection sampling is performed by the NYC DOHMH, who use a 30-day averaging period for computing pathogen geometric means and comparing with applicable water quality criteria at the beaches. Therefore, DEP will use a 30-day averaging period for beach advisories, and seasonal averaging period for the LTCP attainability analysis.

   Because rainfall observed in New York City during 2011 was the largest annual rainfall measured in the period of record, 2011 would not be considered 'typical' by any statistical method and so DEP is not proposing to include 2011 in the period for conducting the long term simulations under the LTCP. At the same time, the 10-15 year water quality simulations involve a range of wet, dry and average rainfall conditions and we will use data from all four (4) rainfall gages described above to perform model simulations based on their vicinity to individual drainage areas.

3. ***Projected Sanitary Flows.*** *The City has proposed an overall planning period for the LTCPs out to 2030. Given that the LTCPs will on average be completed around 2015, and at the latest by 2017, the proposed planning horizon for all of the LTCPs is too short. The EPA's LTCP Guidance recommends planning periods of between 25 to 30 years. As such, the Department requests that the City extend their planning horizons for the LTCPs to 2045 and describe the basis for completing the population projections for that period.*

   Response:

   DEP can extend the planning horizon for the LTCPs to 2040 as this will be the extent to which DEP will have updated projections from the NYC Department of City Planning.

4. ***WWTP Wet Weather Flows.*** *The City has proposed using 2xDDWF to represent the CSO capture volumes during wet weather events; however, the Department has previously expressed uncertainty that wet weather flows of 2xDDWF are consistently reached the treatment plants and therefore it may not be representative of the actual system performance. If used for the LTCPs, 2xDDWF will certainly constitute a best case scenario. As such, the Department requests that the City's watershed specific LTCPs should more thoroughly characterize each drainage basin sewer system and treatment*

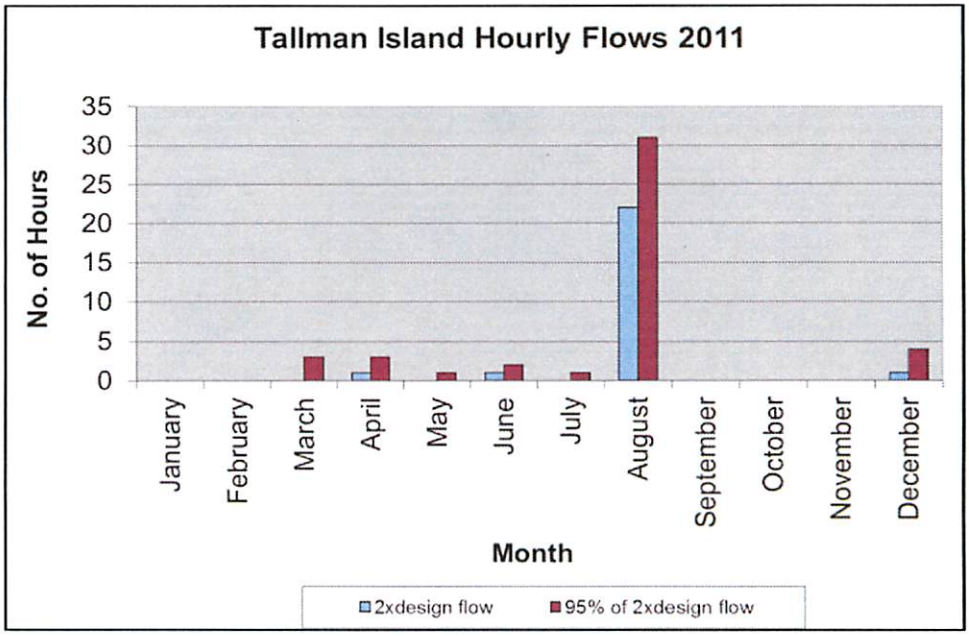
plant to determine whether the system has been optimized in accordance with the SPDES permit and EPA's nine minimum controls as a condition to accepting the 2xDDWF as a baseline condition.

Response:

Plant specific analysis will be conducted although using actual plant data may unfairly bias the analysis since all the WWTPs have the capability to pump and treat 2xDDWF. The impediment to getting to 2xDDWF in most cases is associated with ongoing construction and the need to limit the amount of wet weather flow in accordance with the approved Wet Weather Operating Plans due to tanks or equipment being out of service. In other instances the impediment may be the sewer system itself and/or sediments in the sewer system but the DEP is currently eliminating these impediments through implementation of a citywide interceptor inspection and cleaning program in conjunctions with sewer and regulator modifications in certain sensitive drainage areas including Tallman Island, Hunts Point, and Jamaica WWTPs. Please note, that a recent interceptor cleaning in the Tallman Island drainage area has significantly increased the wet weather flow being conveyed to the treatment plant and the ongoing installation of a parallel interceptor will free up more capacity in the interceptors. Summaries of the plant wet weather performance in 2010 and Tallman Island hourly flows in 2011 are provided below:

CY2010 WWTP Wet Weather Operations

		Top-Ten-Storm Average			Top-Ten-Storm Maximum		
Plant	Permitted Capacity	Reported Capacity	Sustained Flow	Peak Flow	Reported Capacity	Sustained Flow	Peak Flow
26th Ward	170	127.5	128	133	127.5	133	138
Bowery Bay	300	200 - 220	234	262	220	253	296
Coney Island	220	193 - 220	211	220	220	223	227
Hunts Point	400	400	386	404	400	404	415
Jamaica	200	150 - 163	156	168	163	173	190
Newtown Creek	620[8]	464 - 542	519	590	542	621	653
North River	340	255 - 340	294	308	340	348	356
Owls Head	240	120 - 240	207	214	240	247	250
Port Richmond	120	90 - 120	104	111	120	136	145
Red Hook	120	120	117	121	120	125	129
Rockaway	90	60 - 90	35	41	90	46	54
Tallman Island	160	160	126	143	160	141	158
Wards Island	500[9]	325 - 413	431	490	413	494	543



5. ***Sewer Conditions.*** *The City has proposed using inspection data, obtained from cleaning activities required under the SPDES Consent Order, to characterize the sediment depths within its interceptors, but will not have comparable data to characterize the sediment depths in the CSO sewer lines. Rather, the City has proposed using any information that would be available for the CSO system, but does not provide assurances that the data will be sufficient for accurately reflecting the sewer system conditions. The Department requests that the City more thoroughly characterize its CSO sewer system to obtain data on sediments levels.*

Response:

In the past, when the LTCP JV performed field inspections/verifications at certain large regulators and combined sewers, it also provided a survey to quantify the amount of sediment. Going forward we will continue to do this with field inspection/verifications associated with ongoing regulator and sewer designs. Additionally, DEP's BWSO reports on the linear feet of sewers cleaned as part of the Annual CSO BMP Report but in most cases does not quantify the amount of sediments found, as many of the cleaning operations involves flushing small sewer lines. For the most part these upstream sewers should not impact CSO capture but, where BWSO does collect this data, we will incorporate it into our modeling analysis.

6. ***IW Model Recalibration.*** *The City has proposed using the SCADA data for the InfoWorks model recalibration, but does not provide any information on how the data will be used. The Department requests clarification on how the SCADA data will be used.*

Response:

The plan is to use the measured depth data at the regulator weirs as recorded and archived in the SCADA system for comparison to modeled/calculated water depths at those same locations. DEP is in the process of reviewing the data and model outputs to see whether this approach is feasible as there are many local factors present that impact the SCADA measured water levels that may not be picked up in the IW model.

If you have any questions regarding this letter please contact me at (718) 595- 5045.

Yours truly,

Anthony Maracic, P.E.
Director, Capital Planning & Asset Management

cc:

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LTCP JV:	W. Leo, P. Young
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